

BENCHMARKS

VOLUME 4 NUMBER 4 NORTH TEXAS STATE UNIVERSITY JULY/AUGUST 1983

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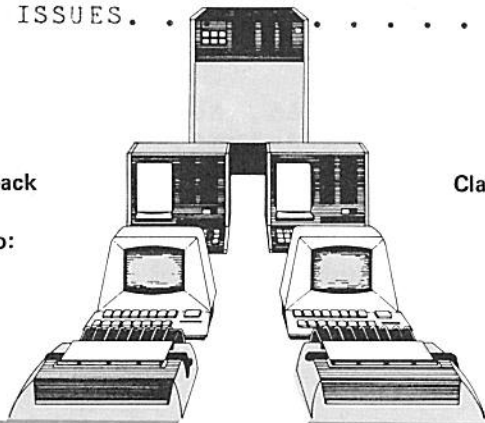
BENCHMARKS Reader/User feedback
is encouraged.

Send all letters, suggestions, etc., to:
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Services Available To Users Of The NTSU Computing Facilities

All people mentioned below may be contacted by calling
(817) 565-2324:

Information, Project Numbers, and IDs- Carolyn Goodman in the
Computing Center reception Area, ISB 119.

Newsletter Questions/Contributions/etc. - Claudia Putnam.

Statistical/Research Support (provided for graduate students
and faculty members) - Bob Brookshire, George Morrow,
Claudia Putnam, and Mohamad Salahshoor.

Non-Research Student Programming Problems - student consultants
from the Computer Science Department are located in GAB
550L. Student consulting provided by the College of
Business is available at the BA Computing Access Facility.

JCL and Debugging Problems - Mohamad Salahshoor.

Pre-Research Counseling, Including Survey Instrument Design -
Bob Brookshire, George Morrow, and Claudia Putnam.

Data Entry to MUSIC, Key punch Requests and Questions Regarding
Layout of Key punch Sheets; Interpreting - Betty Grise,
ISE 227.

Test Scoring and Analysis - Betty Grise.

Academic Timesharing Information and/or Problems HP 2000 and
AS/5000 MUSIC (McGill University System for Interactive
Computing) information and problems, including terminal
problems - Mohamad Salahshoor. VAX 11/780 information
and/or problems - Kim Stickney.

Administrative Applications - Coy Hoggard.

AS/5000 Computer Hardware/Software/Billing Problems - Sandy
Franklin.

JOB Submission and Retrieval - RJE Operators.

Fall Computing Hours

Computing facilities will be open during the following times
throughout the Fall (not applicable to holidays):

Computing Center RJE: 8 AM - Midnight, Monday-Saturday;
Noon-Midnight, Sunday.

College of Business RJE: 8:15 AM - Midnight, Monday-Saturday;
12:15 PM - Midnight, Sunday

5th Floor GAB: 7 AM - 2 AM, Monday-Saturday;
Noon - Midnight, Sunday

The Computer Room and student keypunch/terminal area (ISB) are
open 24 hrs/day Mon.-Fri., 8 AM-MN Sat. and Noon-MN Sun. System
Backups (see this issue for schedules) and backlog processing
are done between the hours of 8 AM and Midnight, Mon.-Sat..

ALTERED HOURS OF OPERATION

The following hours will be in effect during Semester Break:

Computing Center RJE	:	OPEN Monday-Saturday 8 AM-Midnight, August 13 - 27. CLOSED August 21 & 28
College of Business RJE	:	CLOSED August 12 - August 28
5th Floor GAB	:	OPEN Monday-Friday 8 AM-Midnight, August 22-26.

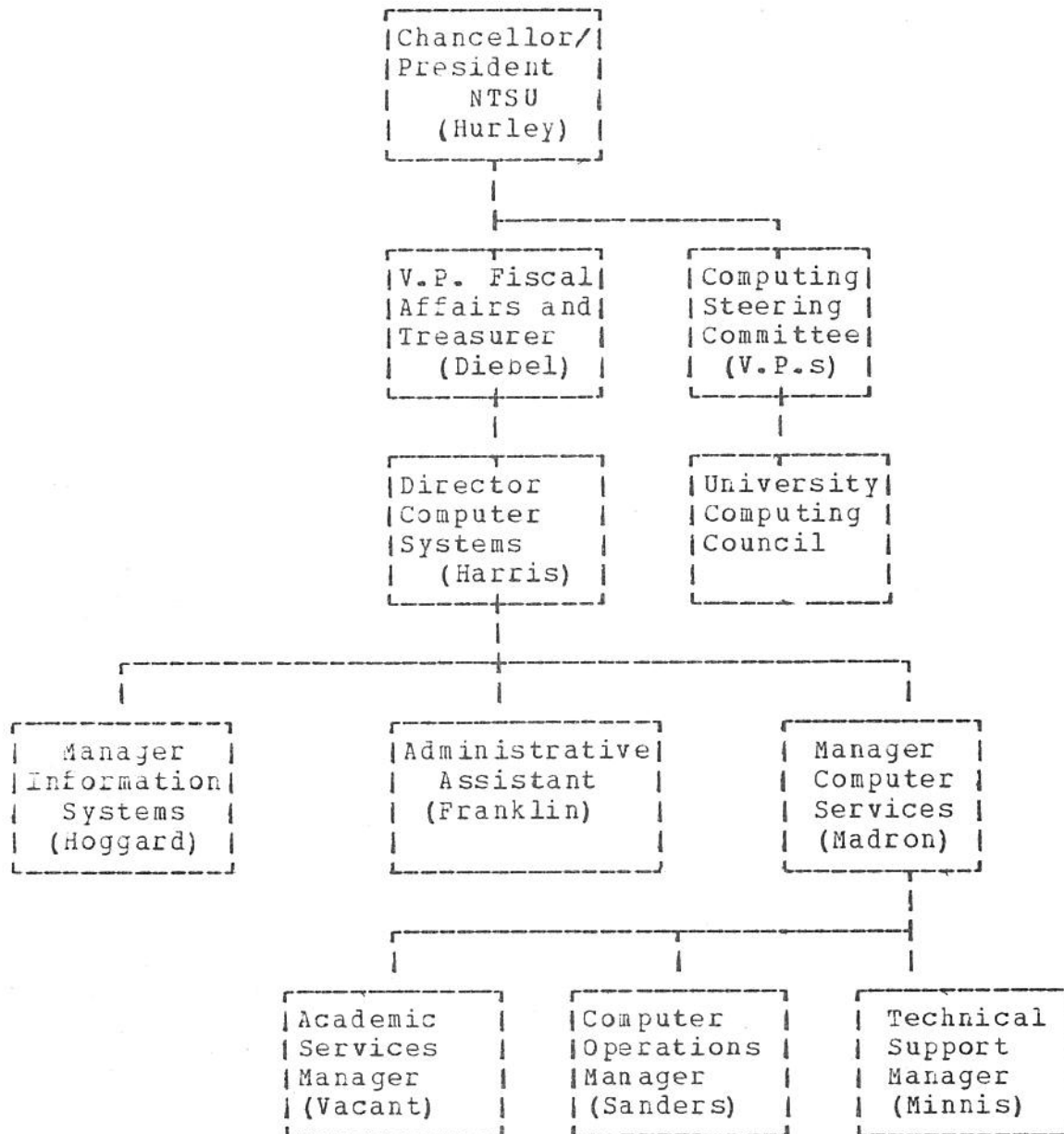
STAFF RANK HIGH IN SYTEK USER'S GROUP

Tom Madron and Mike Maner, both of the Computer Services area of the Computing Center, attended the SYTEK User's Group meeting in Palo Alto, California during the month of June and came away with the positions of President and Vice President, respectively. SYTEK is the company that markets the Local Area Network (LAN) that is currently being installed throughout the University and that will be the primary avenue of communication with our computers by the end of the Fall semester. (See BENCHMARKS, Volume 4 Number 2, "Status Report on Computing at NTSU," for more information on the LAN).

THE COMPUTING CENTER HAS REORGANIZED !

The organization of the Computing Center has changed. The responsibility for delivery, reliability, and performance of computer services is now assigned to the Manager of Computer Services, Tom Madron (whose title has changed as well, it was Manager of Academic Computing Services). The responsibility for the development, implementation, and maintenance of information systems is assigned to the Manager of Information Systems (Coy Hoggard). Following is a chart of the new organization of the Computing Center.

NTSU Computing Center Organization - July, 1983



Computing Center Status Report: July 1983
by Thomas Wm. Madron, Manager of Computer Services

July and August have been exceptionally busy around the Computing Center, and September promises to be equally hectic. The original plan, after National Advanced Systems (NAS) won the bid for IBM-compatible computing (in June), was to install the AS/6650 during August and the AS/8040 in November. Because of shipping opportunities for National, that schedule was reversed and the AS/8040 has been installed in the GAB 5th floor computing facility.

The intent was to have the 8040 on line, replacing the AS/5000 by the first of September. Because of shipping delays in related equipment the cutover schedule may have to be slipped to the end of the second week of September. The AS/8040 is the machine which will be used primarily for instruction and research while the AS/6650 will be used primarily for administrative computing.

While the two computers will be located on the 5th Floor of the GAB, printed output will continue to take place in the Information Sciences building as well as at RJE stations. On order is a near letter quality laser printer and an impact printer from Hewlett-Packard. The laser printer will operate at 45 pages per minute (about 2900 lines per minute) and the impact printer at 1000 lines per minute.

The Local Area Network (LAN) is being deployed as quickly as possible and virtually all academic terminals will be using the LAN by September 1. Telephone dial-up lines will continue to be available, but they will be connected to the LAN making it possible for any user, either local or dial-up, to access either the NAS computers or the VAX 11/780s. As soon as deliveries of terminals are made, the terminal area on the 5th Floor of the GAB will have 64 terminals, as will the terminal facility in Business Administration. A terminal cluster of 24 terminals will replace the keypunches in ISB (see "Keypunch Machines Bite the Dust," in this issue). The plan is to increase the terminal cluster in Wooten from four to eight terminals and later in the year to do the same for the cluster in Music. As a result, there will be nearly four times as many terminals available for public use during the 1983-84 Academic year as were previously on hand.

With the number of new machines being installed not all documentation is yet available. A reasonably full set of VAX manuals should be available shortly in each terminal cluster. Short instructional "cheat sheets" are available from the Computing Center explaining the use of the LAN. In addition, reference cards are also available from The Computing Center which deal with the new Tape Management System (TMS), and for microcomputer users, one for the CP/M operating system. You must watch BENCHMARKS for the most current information on all systems.

NTSU COMPUTING CENTER GENERAL AND ACADEMIC CONSULTING POLICIES

The NTSU Computing Center operates as a service department of the University, established to provide shared computing resources for instruction, research, and administration. The Center also provides coordination, advice, and assistance in the acquisition, installation, and maintenance of minicomputers, microcomputers, and terminals.

The Computing Center reports to the Vice-President for Fiscal Affairs and Treasurer, and works closely with the University Computing Council, which reports to a steering committee of NTSU vice-presidents and the ICOM president.

General Policies:

Academic and administrative departments (account numbers 10000-49999) are no longer charged for their use of computing services. Therefore, in-

structional computing resources are handled very similarly to Library resources. However, faculty members are expected to make cost-effective use of the services provided and use good judgement when making class assignments, particularly during peak workload periods. Services are authorized by approval of Project Authorization Forms, which department heads are required to review and approve.

External grants and auxiliary enterprises are still budgeted and controlled the same as any other expenditure. The Computing Center provides computing services for TCOM through an interagency agreement and also provides limited services to other governmental agencies.

Academic Consulting Policy:

All disciplines are putting greater and greater emphasis on computing, making it necessary for individual faculty members and students to learn to deal with computing facilities directly, without the need for intervention by computer professionals. In addition to limits on personnel time, it is not generally a good idea for a person working on a research project to maintain a position remote from the analysis of his/her data. The analysis of research data is an intrinsic part of the research process and it requires the same care and understanding of the research assumptions as does the design and collection of the data.

Academic Computing Services exists, therefore, to assist faculty and students in the best, most comprehensive use of the computing facilities. Some of the facilities users might require are statistical programming systems such as SPSS and SAS, programming languages such as FORTRAN and COBOL, and/or word processing software such as MUSIC SCRIPT. The staff can also be of assistance in the design stage of research or instructional projects so that ease of use of the computing facilities is assured.

Academic Computing Services staff will aid individuals in learning the use of the hardware and software facilities available. Under ordinary circumstances Academic Computing Services personnel will not literally do projects for an individual, but will try to provide advice on how to complete the project most efficiently and effectively.

When a project request is initiated by a faculty member or student, the staff will attempt to recommend the best approach to completing the project. If the request requires software not currently available at NISU the staff will assist the researcher in finding appropriate software. If the project requires major program development or the expenditure of a significant amount of money to acquire the software, then the person(s) making the request must submit a proposal to the University Computing Council for review. Otherwise, the staff will seek to provide the appropriate software based on perceived need and generality of use. In general, without considerable lead time, Academic Computing Services cannot provide significant amounts of original programming support. After all is said and done, however, if original programs must be written, and if the staff cannot provide the personnel, the staff will assist the researcher to recruit a programmer (s) he can hire with his/her funds to provide the program support.

Notwithstanding the position taken above, there are few problems requiring the use of the computing facilities which cannot be accomplished with existing software. It is, therefore, a major part of the mission of Academic Computing Services to bring the appropriate resources and facil-

ities together with the researcher. It is the further mission of Academic Computing Services to provide such training and consulting services as are needed so that students and faculty members can effectively and efficiently use the computing facilities.

NTSU maintains considerable computing resources for academic computing purposes and is likely to obtain more in the future. The opportunity for use is limited only by the imagination of the potential user. It is the objective of the Computing Center to provide for that use in the best possible fashion.

CONSULTING SERVICES AVAILABLE TO STUDENT PROGRAMMERS

The Computing Center offers research and statistical programming consultation to graduate students and faculty members, and will provide JCL and debugging help on a limited basis to anyone who needs it. The type of help often needed by Computer and Information Science undergraduate students, however, must be sought elsewhere.

The Computer Science Department hires student consultants who are on duty in GAB 550L approximately 20 hours each week beginning the 4th week of the semester. Their primary function is to help students in CSCI classes 110, 111, 232, 201, 340 and 370 with program design and syntax errors in BASIC, PASCAL, FORTRAN, 360 Assembly, SNOBOL and PL/I. They do, however, insofar as they are able, consult with any student from any department. When there are people waiting, consulting time is limited to 5-10 minutes per student. The consulting hours for this semester will be announced at a later date. No consultants are scheduled during finals week. Any questions regarding the Computer Science consultants should be directed to Susan Rulon, Microcomputer Lab Director, GAB 330A, ext. 2810.

The College of Business Computing Center is divided into three areas, the Microcomputer Lab, the Minicomputer Lab, and the Remote Job Entry (RJE) area that was operated by the Computing Center in the past. According to Cengiz Capan, Manager of the College of Business Computing Center, plans have not yet been finalized with regard to the level of consulting that will be available in the fall. This information will be announced at a later date.

The Operations section of the Computing Center provides the following services at its Remote Job Entry Station, located in the Information Sciences Building (room 134).

1. Distribution of output routed to RJE printer. Punched output distributed.
2. Information on individual job processing status.
3. Job submission: instructing new users in operation of the RJE card readers, and ascertaining validity of the JOB card. Reading in card decks for users when the system has been down, or the card reader is inoperative.

4. Basic guidance in the use of the keypunch machines and program drums.
5. Assisting users in logging onto a display or hard-copy terminal.
6. Running 80/80 listings and performing card utilities.
7. Sample JCL setups for the most frequently used languages, and manuals for all current languages, user guides, and a collection of BENCHMARKS for reference.
8. Special handling requests for jobs, such as punched output or special forms can be phoned in at 565-3860.
9. A Diablo printer is available for use by computer users to print MUSIC/SCRIPT files and other documents which require high-quality upper and lower case typewriter-like print.

IMSL INSTALLED

The IMSL library has been acquired and installed on the NAS/5000. It is a comprehensive set of over 540 mathematical and statistical FORTRAN subroutines that can be utilized in the development of FORTRAN applications programs. The following are general categories of subroutines available in the IMSL Library.

1. Analysis of Variance
2. Basic Statistics
3. Categorized Data Analysis
4. Differential Equations; Quadrature; Differentiation
5. Eigensystem Analysis
6. Forecasting; Econometrics; Time Series; Transforms
7. Generation and Testing of Random Numbers
8. Interpolation; Approximation; Smoothing
9. Linear Algebraic Equations
10. Mathematical and Statistical Special Functions
11. Nonparametric Statistics
12. Observation Structure; Multivariate Statistics
13. Regression Analysis
14. Sampling

15. Utility Functions

16. Vector, Matrix Arithmetic

17. Zeros and Extrema; Linear Programming

The manuals for the IMSL library are available in the Science and Technology Library (ISB) on microfiche.

In order to access any of the IMSL routines, the following SYSLIB cards must be included in your step that executes FORGCLG:

```
//LKED.SYSLIB DD DSN=SYS1.FORTLIB,DISP=SHR
//              DD DSN=RSRCH.D0683.IMSL.E91.DPLIB,UNIT=SYSDA,DISP=SHR
```

WARNING: Our IMSL library is a double precision library, therefore, all real variables in your FORTRAN program must be declared REAL*8.

E.T., CALL LAN

The Local Area Network (LAN) is now accessible via phone line. The number is 565-4030, and this means that you can access MUSIC, the VAXs, or the HP2000 just by dialing this number. All lines that are connected to the system through this phone line are capable of handling 300/1200 baud modems. When you establish a connection through this number, you will be prompted with a pound sign (#). Depress the RETURN key once if the pound sign is not displayed. Now you will be able to establish a session with the computer of your choice through the call command:

```
#CALL 5000      <--- to access MUSIC (NAS/5000)
#CALL 2000      <--- to access HP-2000
#CALL A780      <--- to access VAX 11/780 system A
#CALL B780      <--- to access VAX 11/780 system B
```

For more information on accessing the Local Area Network, a Quick Reference Guide is available at the Computing Center (ISB), the College of Business RJE, or the 5th floor GAB.

AN EXPLANATION OF DUPLEX

Occasionally, we encounter some confusion concerning the notion of duplex. The term "duplex" is most frequently used in the context of the full and half duplex settings for terminals, modems, terminal simulation programs, etc... In this sense, duplex refers to the enabling and disabling of a phenomenon called "echo." The term "echo" is used to describe the act of displaying characters at your terminal as they are typed. Echo can be enabled or disabled at the terminal, a modem, the host computer, or the Local Area Network. Therefore, echoing can be accomplished at several different levels. If echo was enabled at your terminal and enabled at the host computer level, then you would receive a double echo, which means that every key you would type would appear twice on your display. In this instance, you would disable the echo (change the duplex

setting) at your terminal to receive a single echo. Thus, in its most common form, half and full duplex are the equivalents of enabled and disabled echo.

Duplex is also used when describing the direction of data transfer between two devices, such as between a host computer and a terminal. Half-duplex communication means that both devices can receive and transmit data but not simultaneously, i.e., when one device is transmitting, the other must be receiving and vice-versa. Full-duplex however, allows for simultaneous transmission and reception by both devices. All of our systems which are accessible over the network have been configured to support full-duplex data transfers so that the network's communications handshaking (the XON/XOFF protocol) will function.

Using the Computer for Research: Part XI -
How to Save Hours and Hours of Time in Survey Research
by Steve Glick

When conducting research, especially survey research, one of the most laborious and error-prone tasks is the transcribing of data from questionnaire to keypunch sheet. This process of coding data is actually one of the most critical in the research process, as no level of sophistication in research design can make up for data which are coded incorrectly. Fortunately, though, this is one task where a bit of planning can save literally dozens of hours. The degree of planning involves only the addition of column numbers to the questionnaire. Column numbers are shown in example two (below), and serve merely to indicate where on the computer card the variable is to be keypunched. If you prepare your questionnaire in this fashion, you can take the completed questionnaires to the Computing Center data entry department (ISB 227) for keying directly from the forms, rather than from the hand-transcribed keypunch sheets.

Although this is an extremely valuable service, it has been our experience that few people utilize it, and instead waste a great deal of their time in transcribing the data. The following example depicts a portion of a typical questionnaire which would have to be manually transcribed to a keypunch sheet.

SUBJECT ID _____ SEX _____
 AGE _____ GROUP _____

1.

- _____ 1. I like computers a whole bunch.
 _____ 2. As far as I'm concerned, CPU's can bite the dust.

2.

- _____ 1. I would rather compute than graduate.
 _____ 2. Graduation is the most important thing in the world.

3. Computers are good

Computers are bad

1. . . . 2. . . . 3. . . . 4 5 6

4. Everyone should have
 a home computer

No one should have
 a home computer

1. . . . 2. . . . 3. . . . 4 5 6

The next example shows the identical questionnaire with one addition: column numbers have been typed adjacent to the responses. This extra bit of attention spent during the initial stages of instrument design will completely free the researcher (or research assistants) from the arduous task of transcribing the data from questionnaire to keypunch worksheet. It should be stressed that the only difference between these two questionnaires is that the second one includes column numbers: this single difference can save you lots of time.

SUBJECT ID _____ (1-3) SEX _____ (4)
 AGE _____ (5-6) GROUP _____ (7)

(8) 1.

- _____ 1. I like computers a whole bunch.
 _____ 2. As far as I'm concerned, CPU's can bite the dust.

(9) 2.

- _____ 1. I would rather compute than graduate.
 _____ 2. Graduation is the most important thing in the world.

(10-11)

3. Computers are good

Computers are bad

1. . . . 2. . . . 3. . . . 4 5 6

4. Everyone should have
 a home computer

No one should have
 a home computer

1. . . . 2. . . . 3. . . . 4 5 6

It is recommended that users request that the questionnaires be both "punched" and "verified". "Punching" is literally that--the punching of

the data onto cards. Verification is similar to punching, except that a data entry person different from the one who originally keyed your data keys the forms a second time. The second time the data are keyed, however, the keypunch machine doesn't actually punch the cards, rather, it checks (verifies) that what has been punched the first time matches what has been keyed the second time. This process virtually insures that the data are coded in an error-free manner.

It is more often than not the case that pre-research consultation between the Computing Center's research consultants and the researcher who plans to use the computer to analyze his data will save all parties concerned a great deal of grief associated with computer analysis (especially for those users who are new to computing).

Those researchers who plan to utilize this keying service should check with data entry (ISB 227) or one of the research consultants to make certain that the questionnaire is in an acceptable format. An additional service provided by the data entry department is the typing of your questionnaire to a MUSIC or WATERLOO SCRIPT (word processing) file on your MUSIC ID. Since data entry will type your questionnaire, you can be sure that column numbers will be entered in an acceptable format.

IMPORTANT NOTE: The Data Entry department will not keypunch directly from your questionnaire if it is not formatted properly. For this reason, if you plan to do your own typing, it is critical that you have your questionnaire format approved before you have your questionnaires printed.

Once the data have been keyed, one might wonder: "Well, what do I do now?" The first step is to transfer the data cards to either a MUSIC file (MUSIC is the IBM timesharing system at NTSU), or to an OS (Operating System) disk pack. This transfer creates a "card-image" file. Instructions on how to go about making this transfer follow, but it may be helpful to first understand that to the computer, this "card-image" file is still a deck of cards. Rather than existing on physical cards though, the data exist as bits of magnetic code. As far as the researcher is concerned this magnetic code may still be thought of as traditional computer cards. As the computing center is making plans to do away with card punches in the near future, (see "Keypunch Machines Bite the Dust" in this issue), a good practice is to go ahead and learn to use MUSIC, if you haven't already done so.

If you have fewer than two or three hundred data cards, the most efficient way to manage the data is to transfer the cards to a "save library file" on your MUSIC ID-Code. Figure 3 shows the job that you should punch on cards to complete this task. If you have more than three hundred data cards, you should transfer them to an OS disk pack. Figure 4 shows the job you would punch on cards to do this.

EXAMPLE 3: MOVING DATA FROM CARDS TO MUSIC

```
//IDCODE JOB (xxxx-yyyy,:10,1),NAME
// EXEC PGM=IEBGENER
//*ROUTE PUNCH MUSIC
//SYSIN DD DUMMY
//SYSPRINT DD SYSOUT=A
//SYSUT2 DD SYSOUT=B,DCB=BLKSIZE=80
//SYSUT1 DD *
.
.
.
data cards go here
.
.
//
```

STUDENT

(Use one of the pink 'student' or 'faculty' cards available in the RJE areas)

Read the cards into the card reader in either the BA or the main RJE station. Once the job has run, go to a MUSIC terminal and sign on. From the command mode (*GO), enter the command "OSJR". This will put you in the MUSIC Job Retrieval procedure. If the job hasn't run, wait for it to run. If it has run, OSJR will say: "JOB 123 PUNCH OUTPUT READY FOR MUSIC". To move the data into a MUSIC Save Library, enter the following command while still in OSJR: "OUT DSID=PUN,FILE=MYFILE", where "MYFILE" is any file name you wish to use. OSJR will respond with "OUTPUT COPIED". At this time, enter the command "purge", type "end" to return to the *GO mode. You will now have a file called "MYFILE" (or whatever name you specified) which contains your data cards.

Example 4 shows how to move the data from cards to an OS disk. The procedure is identical to example 3, except that instructions are given to the computer as to where to put the data on an OS disk.

EXAMPLE 4: MOVING DATA FROM CARDS TO AN OS-DISK PACK

```
//IDCODE JOB (xxxx-yyyy,:10,1),NAME
// EXEC PGM=IEBGENER
//SYSIN DD DUMMY
//SYSPRINT DD SYSOUT=A
//SYSUT2 DD DSN=USER1.Dxxxx.Pyyyy.MYDATA,DISP=(NEW,KEEP),
//      SPACE=(401000,100,(RLSE)),VOL=SER=ACADnn,
//      DCB=(LRECL=80,RECFB=FB,BLKSIZE=1600)
//SYSUT1 DD *
.
.
.
data cards go here
.
.
//
```

STUDENT

(Use one of the pink 'student' or 'faculty' cards available in the RJE areas)

Once this job has run, the data will exist on an OS-disk pack which is called "ACADnn," where "nn" is either 00, 01, or 02, depending on the nature of your work. ACAD01 is reserved for College of Business classwork, ACAD02 is for all other classwork, and ACAD00 is for research. The Data Set Name (DSN) which you used in run is the name which you will use to direct one of the statistical packages (SPSS, SAS, etc.) to find the data. If you need help in retrieving the data with a statistical package or other program, contact one of the research consultants at the Computing Center (565-2324).

NOTE: In example 3 (above), the first four characters on the jobcard must be the same as your MUSIC-ID. In example 4, prepare the DSN in the following format, (USER1.Dxxxx.Pyyyy.MYDATA), where 'xxxx' matches the first 4 digits of your project number, yyyy matches the last 4 digits, and 'MYDATA' is any name that you choose. The entire DSN can't exceed 44 characters, and each 8 characters must be separated by a period '.'.

```
* * * * *
*
*   O P E R A T I O N S   *
*
* * * * *
```

Backup Schedule for OS/MVT

OS/MVT disk packs (Academic and Administrative) are backed up daily, Tuesday through Saturday, from 4-6:30 AM, and Sunday from Midnight to 3 AM. A backup of all the operating systems and their contents is done once every two weeks at some low activity period over the weekend.

Keypunch Machines Bite the Dust

The Computing Center has not renewed our lease on the 029 keypunch machines and will be disposing of them on or about September 1, 1983. Two will remain in the Business Administration building and two will remain in the ISB for the time being, but these will also eventually be removed. Computer terminals will replace the keypunches. The current plan calls for at least 64 terminals being in place in the BA, 64 in the GAB and 24 in the ISB early in the Fall semester.

All people who have done a lot of batch processing in the past in which punched cards were used should probably make alternative arrangements for the Fall and future semesters. Some alternatives would be to use MUSIC, the VAXs, or some other interactive devices such as microcomputers.

The Computing Center is attempting to make hardware and software changes that are compatible with a 1980's computing environment, and this

move, along with other changes that are taking place is reflective of this goal. Please feel free to consult with any member of Academic Computing Services if you have any questions or concerns with regard to the abolition of the keypunch machines.

Primary Access Centers Changed

The terminal area in the Media Library (GAB) has been reduced in size, so that only two public access terminals are now housed there. The 5th floor GAB is now a primary computer access area, where public terminals are available on a first-come first-served basis for 1 hour at a time.

Working With TMS: Initializing Out of Area Tapes

Researchers frequently request data from outside sources and are asked to send a tape on which the requested information can be stored and then returned to the researcher. If you are in this situation and you plan to have the tape copied over to TMS, you may want to save yourself some time and trouble by having a tape initialized under TMS and then marked "out of area" when you send it to be written on. When the tape returns you can have it re-classified as a resident TMS tape and you will be all ready to go!

AS/5000 Performance Statistics for June, July

June Performance Summary *

System Type	Operating Hours Scheduled (OHS)	Maintenance Hours Planned (MHP)	Production Hours Planned (PHP)	Maintenance Hours Unplanned (MHU)	Actual Production Hours (APH)	System Uptime (SU)
VM/SP	720	0.00	720.00	71.94	648.06	90.0%
MUSIC	720	20.47	699.53	79.06	620.47	88.7%
OS/MVT	658	0.00	658.00	74.27	583.73	88.7%
COMPLETE	257	0.00	257.00	12.74	244.26	95.0%
ADABAS	257	0.00	257.00	13.39	243.61	94.8%

Lost Productivity Hours can be contributed to the following key causes*:

CPU, Tape, and Disk Subsystems (NAS)

1. CPU Timing Failures	38.78 Hours
2. CPU Timing Fix	8.13 Hours
3. CPU Power Control Logic Failures	8.68 Hours
4. 7330 DASD Failures	11.13 Hours
5. 7350 DASD Failures	4.69 Hours
TOTAL	68.41 Hours

Electrical & A/C Interruptions

1. Power Failures (2 Hits)	11.45 Hours
2. Faulty Main Power Panel Replacement	6.37 Hours
TOTAL	11.82 Hours

Unit Record Devices (IBM)

1. 3203 Printer Installation	3.11 Hours
------------------------------	------------

Terminal Control Systems (MEMOREX)

1. 1270 TCU Malfunctions	3.25 Hours
--------------------------	------------

Miscellaneous

1. Undetermined Causes for System Restarts	2.43 Hours
2. 3203 Printer FCB Failure/Fix	2.61 Hours
3. COM-LETE/ADABAS Program Maintenance	1.13 Hours
TOTAL	6.17 Hours
GRAND TOTAL	95.65 Hours

July Performance Summary *

System Type	Operating Hours Scheduled (OHS)	Maintenance Hours Planned (MHP)	Production Hours Planned (PHP)	Maintenance Hours Unplanned (MHU)	Actual Production Hours (APH)	System Uptime (SU)
VM/SP	744	4.42	739.58	16.90	722.68	97.7%
MUSIC	744	26.61	717.39	33.32	684.07	95.4%
OS/MVT	671	5.31	665.69	34.94	630.75	94.8%
COMPLETE	255	3.50	251.50	14.86	236.64	94.1%
ADABAS	255	3.61	251.33	14.99	236.34	94.0%

Lost Productivity Hours can be contributed to the following key causes*:

CPU, Tape, and Disk Subsystems (NAS)

1. CPU Parity Errors in XAR	6.08 Hours
2. 7835 Port 2 DASD C.U. Failure	1.42 Hours
3. 7330 DASD Failures	1.35 Hours
4. 7350 DASD Failures	8.01 Hours
5. Scheduled Maintenance	4.88 Hours
TOTAL	21.74 Hours

Unit Record Devices (IBM)

1. 2821 I/O C.U. Failures	22.95 Hours
2. 3525 Card Punch Failures	3.11 Hours
3. 3272 TCU Failures	<u>3.51 Hours</u>
TOTAL	29.67 Hours

Terminal Control Systems (MEMOREX)

1. 1270 TCU Malfunctions	2.42 Hours
--------------------------	------------

Miscellaneous

1. Undetermined Causes for System Restarts	1.30 Hours
2. TMS Update	3.11 Hours
3. COM-LETE/ADABAS Program Maintenance	<u>1.00 Hours</u>
TOTAL	<u>3.83 Hours</u>
GRAND TOTAL	57.66 Hours

*NOTE 1: CPU availability will be approximately equal to VM's % Uptime.

*NOTE 2: SU = APH/PHP

*NOTE 3: APH = PHP - MHU

*NOTE 4: PHP = OHS - MHP

*NOTE 5: OHS = PHP + MHP

*NOTE 6: MUSIC's PLANNED MAINTENANCE HOURS includes 20.20 hours of system backup time in June, and 21.73 hours of system backup time in July.

*Lost productivity is calculated on the greatest amount of elapsed time that any one of the production systems was unavailable for scheduled operation.

```
* * * * *
*
*       S P S S
*
* * * * *
```

SPSS 9.1 Gets Reprieve

The original plan was to purge SPSS Version 9.1 from the system at the beginning of the Fall semester, thus forcing everyone to use the "newer and better," albeit somewhat different, SPSS-X. This plan has been altered, somewhat, so that SPSS 9.1 will be left on the system until the end of the Fall semester. This should give everyone plenty of leeway in getting used to SPSS-X, even if they weren't here during the summer.

```

* * * * *
*           *
*       S A S       *
*           *
* * * * *

```

SAS 82.3

The last issue of BENCHMARKS announced the installation of SAS 82.3. It has now become the default procedure, so that when you execute SAS, you automatically get SAS 82.3

The following information documents various foibles and idiosyncrasies present in the many features and procedures of SAS 82.3.

PROC ADCLUS

- OPT=3 and OPT=4 may give suboptimal solutions. The problem has appeared only with multiple similarity matrices.

PROC ALSCAL:

- A system completion code 0C5 occurs when an output data set for 5 or 6 dimensions is created.
- Enhancements: PROC ALSCAL options;

MAXDIM=n	Use the MAXDIM and MINDIM options when you want to scale your data in several spaces differing in their dimensionality.
DIMMAX=n	Solutions will be obtained for spaces of each dimensionality from MAXDIM down to MINDIM, inclusive. The number of solutions will be MAXDIM-MINDIM+1. The number of dimensions (n) may be an integer value 1 through 6. MAXDIM may not be less than MINDIM.
MINDIM=n	
DIMMIN=n	
HEADER	Use the HEADER option to print a header summarizing the options in effect for the analysis.
CONDITION	This option is equivalent to CONDITIN.
WRITE	This option is no longer needed and has no effect.
- Printed Output changes: The missing data message is not printed when a matrix has no missing data. The header page has been changed. The average S-STRESS and RSQ values are now printed correctly when the data are SHAPE=RECTANGULAR and CONDITION=ROW.
- Algorithmic Changes: Changes have been made in the way that missing data are estimated for computation of the initial configuration. Rabionwitz's Line-Of-Sight procedure is now used. This provides much better initial configurations, especially when there are large amounts of missing data. Unfolding (i.e., analyzing RECTANGULAR data) works much better due to the changes in estimating missing data on the diagonal blocks. Also, Shonemann's solvability conditions are checked, and the analysis aborted when they are not satisfied. An error message will be printed.

- **ERROR CHANGES:** The CUTOFF parameter now works properly for SHAPE=RECTANGULAR data. Three errors have been found in the routine that transforms the data when LEVEL=INTERNAL and when the transformation is DEGREE=1 (the default LEVEL and DEGREE). Two of these errors have been fixed, and the third is being investigated. Until the third is fixed, the default measurement will be LEVEL=ORDINAL.
- OUT= must be specified if INITIAL= is used. Any of a wide variety of errors may occur otherwise, the nature of which are system and data dependent. One possible effect is that the initial values will be garbage, causing overflow or suboptimal solutions if the procedure runs to completion.

PROC ANOVA

- In earlier releases, the dependent variable label was printed after the heading for the MEANS/DUNCAN output. Now a note prints over the label and it is not being shown.

PROC BMDP

- Since NTSU is running the 1982 version of BMDP, DO NOT specify UNIT= on the PROC BMDP statement.
- BMDP and SAS use different structures for correlation matrices. If you create a correlation matrix with PROC CORR and try to use it in a PROC BMDP statement for a BMDP procedure, it will probably give you a "BMDP file error." You must first convert the SAS correlation matrix into the form BMDP expects before calling PROC BMDP. The same goes when using an output correlation matrix from BMDP: it must be converted to a proper SAS correlation matrix before SAS procedures (such as SYSREG) can use it correctly.

PROC CHART

- When charting continuous variables, CHART selects midpoints of the intervals to be represented in the chart. If the value of a variable falls exactly half way between two midpoints shown on the chart, SAS puts the value in the higher of the two intervals.
- The maximum number of levels allowed for a PIE chart is 50. An HBAR chart will be produced if the number of levels exceeds 50.
- The maximum number of levels allowed for a STAR chart is 24. An HBAR chart will be produced if the number of levels exceeds 24.
- When using SUBGROUP= the height of the bar for each subgroup is calculated individually, rounding up or down depending on its percentage of the total bar. Rounding may cause the total height of the bar to be higher or lower than it would be if SUBGROUP= was not specified. If all subgroups are rounded up, the bar height will be greater than the total allowed and the subgroups on top may not appear.
- PROC CHART does not use the format associated with the SUMVAR variable when TYPE=MEAN is specified; the format is used only for TYPE=SUM.

- One slice of a PIE chart will be grouped into 'OTHER' if the level accounts for less than three print positions on the circle's perimeter.
- CHART doesn't print extremely large frequencies correctly. If the FREQ= option is used with CHART, and the variable indicated has extremely large values, the printed values may be incorrect. This is because CHART accumulates frequencies in fullword integer format, and very large values may cause overflows. These overflows are not indicated anywhere in the listing. If SUMVAR= is used, everything works correctly.
- If a single HBAR statement in PROC CHART specifies charts for more than one variable, and each variable has a different format, the format for the first variable will be used for all of the variables for which charts are produced. This problem occurs when the MIDPOINTS option is used. If the user specifies the DISCRETE option to specify values, the problem does not occur.
- If a variable represented in a pie chart has only one value (such that there is only one slice), the leftmost digit on the percentage is truncated. Instead of 100.00% PROC CHART produces 00.00%.
- A PIE chart with PAGESIZE=90 and LINESIZE=132 produces a few lines of garbage at the bottom of the page, just below the pie. Using a shorter linesize or pagesize eliminates the problem.
- PROC CHART does not verify that a SUMVAR variable is numeric before summing. Instead, it accepts a character variable and sums the EBCDIC representation.
- When TYPE=CFREQ or TYPE=CPCT are used with pie or star charts, the TYPE= option is ignored, and TYPE=FREQ is assumed.

PROC CLUSTER

- In PROC CLUSTER an overflow can occur if the standard deviation of the variables is too large. A circumvention is to divide all variables by ten, or by the largest standard deviation of all the variables. Try to get the standard deviation to be close to unity for numeric variables used in the VAR list.

PROC COMPUTAB

- COMPUTAB currently does not support the SAS/IO statements; SET, MERGE, UPDATE, INPUT or PUT. If used, SAS abends.
- If MTITLE test length is greater than or equal to the width occupied by the columns to which the MTITLE applies, columns following the MTITLE are shifted to the right an extra number of positions. Row titles positioned with _TITLES_ are positioned correctly and may be written over by incorrectly shifted columns.
- Using the SUMBY statement to consolidate values over multiple BY variables does not work properly if there are more than two variables on the SUMBY statement.

PROC CORR

- The NOPROB option in PROC CORR suppresses variable labels.

PROC DATASETS

- To list the data sets you want to keep in a SAS data base, use a SAVE statement, not a KEEP statement.
- Page 705 of the SAS User's Guide: Basics 1982 Edition gives an example in which an abbreviated variable list occurs in a RENAME statement. PROC DATASETS does not support this, this is a documentation error.

PROC DISCRIM

- To get what some statistical packages refer to as standardized discriminant functions, do the following:
 1. Code dummy 0-1 variables for the classification variable. The number of dummy variables should be one less than the number of classes.
 2. Use CANCORR to run a canonical correlation analysis between the dummy variables and the numeric variables. Look at the CANONICAL COEFFICIENTS.

Example:

```
DATA; INPUT GROUP $ X Y Z;
```

```
CARDS;
```

```
A 1 2 3
```

```
B 4 5 6
```

```
. . . input data . . .
```

To code the dummy variables:

```
DATA; SET; DUMMY1=(GROUP='B'); DUMMY2=(GROUP='C'); . . .
```

To produce the canonical correlations:

```
PROC CANCORR; VAR X Y Z; WITH DUMMY1-DUMMYn;
```

3. PROC DISCRIM does not produce a linearized discriminant function when POOL=NO. In fact, no such thing exists. There is a quadratic discriminant function, but PROC DISCRIM does not print it. A user has written a macro to compute the quadratic discriminant. See SUGI Proceedings, 1981, p. 531, "A SAS MACRO for Calculating the Quadratic Discriminant Function," by Charles S. Davis.

PROC EDITOR

- The LASI keyword for the last observation works only as the second part of a range specification, e.g. LIST 1, LAST; With only the keyword: LIST LAST; it prints the current observation for a variable called LAST. To list the last observation enter: BOTTOM; LAST;
- In order to locate character values containing leading blanks using the FIND command, you need to specify the appropriate \$CHARw. format on an INFORMAT statement. Place the INFORMAT statement after the PROC statement and before the RUN statement.

PROC FORECAST

- FORECAST handles missing values embedded in the series (for STEPARD method), replacing them with forecasted values. PROC FORECAST returns the message: NOT ENOUGH OBSERVATIONS TO FORECAST in the simplest invocation of PROC FORECAST when there is less than 26 observations in the data set to be forecasted. This is because the default method is STEPARD and the default number of lags is 13. To circumvent this, specify a smaller number of lags ($< \text{one half the number of observations}$), or use METHOD=EXPO.
- When METHOD=EXPO and TREND=3 are specified, the standard of the predicted value is calculated incorrectly.
- If LEAD=0 is specified it is ignored and the default of LEAD=12 is used.

PROC FORMAT

- The LOW keyword must be used first in the list. Otherwise you get ERROR2: DUPLICATE OR OVERLAPPING VALUES.
- Formatted values must be in quotes if you have a number followed by E or D; otherwise, you get error message 106. For example:
PROC FORMAT;
VALUE XYZ 1='5E' 2=5W 3=6M;
- If you are creating formats via PROC FORMAT and want to use the formats in the same SAS step, you may abend with a S106E if you use separate DD statements for storing and retrieving the formats. To avoid this, use PROC FORMAT DDNAME=SASLIB, and include a //SASLIB DD statement in the JCL for both storage and retrieval.
- The use of null formats causes unpredictable results. If used in a PUT function, the job will abend with a S0Cr; if used with PROC PRINT, only the variable names are printed.
- To change the format of a variable already stored in a SAS data set, follow the SET statement with a FORMAT statement.

FORMATS

- WEEKDATE and WORDDATE right align when the output field is larger than needed.
- PUT _ALL_; uses the BEST8. format for variables that do not have a format. If a PDw.d format is used in a PUT or FORMAT statement, and d is greater than or equal to w, you get this error message:

ERROR 143: 0<=NUMBER of DECIMAL PLACES<WIDTH

even though $d \leq (2*w-1)$ is possible. The error does not occur when the PDw.d is an INFORMAT or when it is used as an output format in a PUT function. To circumvent the problem, scale up the value being formatted by $10**x$ so that $d-x=w-1$, and specify a format of PDw.d-x in the PUT statement.

- The SAS User's Guide: Basics documentation states that SAS supports the ZD format width of 32; however, incorrect output is produced for a width greater than 16.

PROC FORMS

- The DOWN= option is ignored when used in conjunction with the DDNAME= option. By specifying CC and DOWN= you get the desired results. Unfortunately, this solution leaves a carriage control character in column one of the first line of a page.
- If both I= and PACK are specified as options on a LINE statement, no indention occurs for that line.

PROC FREQ

- Total weighted values are rounded before printing. Values in the output data set are not rounded.
- PROC FREQ skips pages when TITLES are used.
- When a variable in a TABLES statement has an associated format that groups the data, FREQ produces one output record for each group defined by the format. The format is associated with the variable on the output data set of frequencies and is used whenever the variable is printed (unless the format is overridden). The actual value of the variable in each output observation is the minimum value that occurs in the data for the group.
- Floating point error in PROC FREQ occurs if there are non-integer weights, and a large number of observations spread over a small number of cells. Frequencies are accumulated in single precision floating point. When they are integers, no error is encountered until the numbers are greater than 7 digits. However, when non-integer weights are used the sum may be inaccurate even after only a thousand observations. Don't use PROC FREQ to accumulate large sums. If you do, use it only when the counts are spread over many levels. Use PROC MEANS and SUMMARY instead, since they use double precision. According to the SAS User's Guide: Basics the NOPERCENT option of PROC FREQ causes the cell percentages of the total frequencies not to be printed. However, the row and column total percentages (at the right hand side and bottom of the table) are not printed either. There is no way to get the row and column total percentages printed without getting the cell total percentages printed also.
- If the first variable in the BY list is formatted and the second is not, the data are grouped without using the format. However, the format is used to print out the results.
- PROC FREQ is not using the BEST12. format for one-way frequency tables. This can result in garbage in the FREQUENCY column when a WEIGHT variable with a very large value is used, such as WEIGHT=1e12. To circumvent this, code a dummy variable that has the same value throughout the data set and use the TABLES statement:

```
TABLES X*DUMMY/LIST;
```

This will force PROC FREQ to use the BEST12. format for the frequency and cumulative frequency.

PROC FUNCAT

- The ML option is effective only when no response function is specified. A RESPONSE statement (even if it gives the standard response function), causes the ML option to be ignored. Thus, if you combine the ML and NOGLS options with a RESPONSE statement, the result is no output except the initial problem description.
- The COV option only produces output when a response function is explicitly given. If you allow the response function to default, COV produces no output.
- FUNCAT gives incorrect parameter estimates (both weighted least squares and maximum likelihood) when the NOINT option is specified and more than one response function is present. No circumvention is known.
- Using the "add constant" transformation on the RESPONSE statement can yield the erroneous message: ERROR: CONSTANT DOES NOT CONFORM TO ADD.

FUNCTIONS

- There two types of SAS functions, library functions and built-in functions. The default length of the receiving variable for library functions is 200. The default length for the built-in functions is the length of the original variable. The buile-in functions are: LAG, DIF, SUBSTR, TRIM, PUT, INPUT.
- Unexpected results occur when the PUT function is used with a variable not previously referenced in the DATA step. The PUT function seems to define the variable as character, even when a numeric format has been specified. Zero values are returned
- The TINV function is causing SAS toabend.
- The INTNX function ahs three arguments, the first of which is to contain only the keyword WEEK, MONTH, QTR, or YEAR. If some other argument is used, a missing value is returned for date, rather than an error message for the invalid argument.
- Functions do not allow over 4095 arguments. To circumvent this, split up the function into two parts so that neither part uses over 4095 arguments.
- When the functions N and NMISS have only one argument, a syntax error 315 occurs: TOO FEW ARGUMENTS TO CALL OR FUNCTION.
- The statement

```
X = POISSON(0,1)
```

causes the error messages: ILLEGAL ARGUMENT TO FUNCTION and MATHEMATICAL OPERATIONS COULD NOT BE PERFORMED

SAS User's Guide: Basics 1982 Edition, however, says that each argument of POISSON must be greater than OR EQUAL TO zero. The formula given on page 177 can be applied to POISSON(0,0) giving the result $(e^{*-0}) * (0^{*0}/\text{factorial}(0))$. This works out to 1 if you define 0^{*0} to be 1, which the SAS system does.

- The RANGE function when called with one argument results in ERROR 316: TOO FEW ARGUMENTS FOR CALL OR FUNCTION.
- If the INTCK function is used with the interval of SECOND, the number of intervals returned is invalid.
- When the first argument (the year) of the YYQ function is invalid, the function correctly returns a missing value but does not print an invalid data message.

PROC GLM

- The TEST statement will not produce any output if E= is not specified. Without an ERROR all values are printed using the model error.
- When the NOSORT OPTION is used on the MEANS statement in GLM, the means for the specified multiple comparison are put in descending order. NOSORT is supposed to keep this from happening.
- An abend may occur when the model is fully specified and a MEANS statement is specified asking for multiple comparisons, but not including the E= option. This is a user error. When E= is not specified, the residual mean square is used, but the residual mean square is zero when the model is fully specified. The user must specify the error term to be used in this case.

PROC HARVEY

- The BY statement does not work with HARVEY. If a BY variable has two or more values, HARVEY produces output for the first BY group only. If a BY variable has one value, HARVEY loops indefinitely.

INFORMAT

- The w.d portion (width and decimal scaling parameter) of an informat is ignored on the INFORMAT statement. A \$w. informat is used only for determining the length of a character variable. Only the informat type (DATE RB PD) is used and only this portion is reported by PROC CONTENTS.

PROC ISAM

- If the ENDKEY and ENDKEYV options appear not to work, check the KEYPOS= and KEYLEN= values. They probably have been set incorrectly. If they are not set properly the program will check the wrong location for the ending key and never find it.
- Although IBM does not support creating ISAM files with internal keys starting in position 1, it is possible to do so. This implies a RKP (relative key position) of 0, which also means that the key is not contained in the record. When an ISAM file is read, with RKP=0 spe-

cified, the key is not returned within the record even if it was intended to be part of the data. When this situation arises the LRECL for the OUTFILE created from PROC ISAM should equal the length of the record less the key length. If the original LRECL is specified the following error message is given: ERROR: XXX LRECL SPECIFIED IS LARGER THAN RECORD SIZE. Also note that since the key is not returned, ENDKEY and ENDKEYV won't work.

PROC LAV

- The LAV procedure does not work correctly when a BY statement is used.
- The LAV procedure does not check for missing vlaues, so missing values are treated as zeros.

PROC LOGIST

- The documentation for PROC LOGIST in the 1980 edition of the SAS Supplemental Library User's Guide refers the reader to reference number 6, which does not appear in the list of references. The reference is: A. R. Shapiro (1977), "The Evaluation or Clinical Prediction", New England Journal of Medicine, 296, 1509-1514.'

PROC MATRIX

- Output data sets created from PROC MATRIX are not available for fetching within the same execution of the procedure.
- If the message portion of the NOTE statement begins with a parenthesis, enclose the message in single quotes. Otherwise MATRIX will think you mean a subscripted assignment.
- The following operations will work properly with any matrix dimensions:
TRACE
DIAG
VECDIAG
+ - # <> >< %& <= < >= > = -= MOD #/
ALL ANY
LOC
(* ,*) subscripts without operators
,
MOVE - - ABS INT
NROW NCOL
SHAPE
*
||
//
SUM SSQ MIN MAX
I
J
- When the user specifies COLNAMES to give variable names for the output data set, MATRIX does not check that the names are valid. If the name begins with a blank, it is ignored. A future release of MATRIX will check variable name validity and produce an error message when appropriate.

- A logical expression of the form " $1 < T < K$ " does not have the same effect in PROC MATRIX that it does in the DATA step. In the DATA step, the expression is true if the value of T is between 1 and K. In PROC MATRIX, the expression " $1 < T$ " is evaluated first; the result of this logical expression (either 0 or 1) is then compared to K. If K is greater than or equal to 1, therefore, the expression " $1 < T < K$ " is true in PROC MATRIX.
- A PROC MATRIX program using very small numbers generates an underflow error message and then goes into a loop. Looping can be avoided by specifying OPTIONS DUMPLONG; so that SAS abends after the underflow condition is raised

PROC MODEL

- MODEL SYSNLIN SIMNLIN has been revised to improve the diagnosis of errors.
 1. Three special variables (_OBS_, _ITER_, and _LIST_) are set up by the compiler. _OBS_ has observation numbers. _ITER_ has the iteration. _LIST_, when set to a nonzero value, dumps the values of all variables.
 2. If an error (such as a zero divide) occurs during the priming of the lag, it is suppressed and execution continues. If the error occurs during the simulation, it is diagnosed better, with a dump of the values.
 3. In both SYSNLIN and SIMNLIN the DETAILS and XREF option can be used to request compiler details and a cross reference respectively.
- Certain constructions of expressions should be avoided since they generate incorrect derivatives. This happens when all of the following hold:
 1. You use an undeclared variable to hold an expression
 2. The derivative of an endogenous variable results in this undeclared variable, and
 3. The undeclared variable is reset later to a different value.
- X1-X8 notation does not work.

MORTGAGE

- When the value of the RATE= option in PROC MORTGAGE is near or over 100%, the PROC divides the RATE= value by 100, that is, RATE=1.1 becomes 1.1%, not 110% as in the SAS/ETS User's Guide 1982 Edition.

PROC OPTIONS

- The LOWERCASE/NOLOWERCASE option is obsolete and replaced by C98/48. If specified, the option is ignored.

PROC PLOT

- It is no longer necessary to specify a lot of points to get true logarithmic plots. If the values specified are logarithmic, the values between points are also interpreted logarithmically.
- When the VAXIS= and/or HAXIS= statements specify an impossibly large number of values, the situation is not diagnosed. SAS mayabend S322 (out of time) without printing the PROC PLOT statements or an error on the log.
- If the value of VREF= specified is greater than the largest value, the reference line is drawn at the top of PLOT and not at the location specified.
- The formula used in determining the last tick mark has been changed when you specify HAXIS= or VAXIS= in the form of

HAXIS=a TO b BY c;

In prior releases, if you specified:

HAXIS=1 TO 72 BY 4;

the last two tick marks would be 69 and 72. Since 72 is not an even increment this value will no longer be a tick mark, and the largest value plotted will be 69.

- FORMATS for character variables are not used for PROC PLOT.

PROC PREDICT

- To create the CALIBRATION data set expected by PREDICT specify POOL=YES on the PROC DISCRIM statement, in addition to specifying a PRIORS statement.
- The signs of the coefficients are backwards

PROC PRINCOMP

- When COV and PARTIAL options are used together, all statistics in the OUTSTAT= data set except means and standard deviations are wrong. The user can fix this situation by either of the following:
 1. Use PROC STANDARD S=1. to standardize only the PARTIAL variables to unit variance,
 2. Use PROC FACTOR.

PROC PRINT

- When the ROUND option is specified for PROC PRINT, PRINT rounds values by multiplying by 10 raised to the number of decimal places specified for the format, rounding the number to an integer, and moving the decimal back to the right place. Since a decimal specification is meaningless for a PICTURE format, most users do not give a decimal specification in the FORMAT statement. PRINT, therefore, rounds the original number to an integer before summing. This ap-

proach causes the sum to be incorrect. To circumvent this, give the correct decimal specification in the FORMAT statement.

- When the ROUND option is specified and one of the SUM variables has a small negative value (for example, -0.0005), the value is rounded to two decimal places, resulting in a rounded value of -0. Since -0 is the internal representation of a missing value, the value is printed as ".". To avoid this, assign a format such as 8.3, where the "d" specification is large enough to ensure that the value will not round to -0.
- When all values for a character variable are missing, PRINT prints an entire column of blanks, and non-missing values in the following columns may be shifted to the left.
- The value of the last ID variable is sometimes partially overprinted by the first variable's value.
- SAS abends sometimes when PROC PRINT attempts to process long character values (approximately 150 or more).
- PROC PRINT ignores PAGESIZE when CORE size is marginally small. PRINT tries to use what is available, and therefore it will process a smaller page of data than PAGESIZE, when PAGESIZE is large. To circumvent this, increase the CORE size.
- In some cases, values of a second ID variable may print as blank. The problem occurs only with a large number of variables.

PROC PRINTTO

- When you use PROC PRINTTO, we suggest that you do not specify any DCB parameters for your output file (the file which PRINTTO is recording your SAS output). If you must specify DCB parameters, specify all DCB parameters completely (RECFM, LRECL, BLKSIZE), and be sure to include an A in the RECFM specification; if you omit the A, SAS procedures written in PL/I will abort.

PROC PROBIT

- It has been reported that sometimes PROBIT executes, produces all expected output, then abends with a SYSTEM CODE=606. Specifying:
OPTIONS LEAVE=4096; before the PROC PROBIT statement should eliminate the problem.

PROC RANK

- The effects of TIES=LOW and TIES=HIGH have been reversed when the DESCENDING option is specified. The change was made because the old method seemed illogical.

PROC REG

- When a BY group is empty because there are missing values in all observations, the labelling of the output pages is incorrect; the empty BY group is used to label the next section of output.

- RESTRICT statements cause garbled names because a work vector was not long enough to hold places for restrictions. It overflows into the memory for variable names only if the number of variables plus restrictions in the model are greater than the maximum of

1. 16 times the number of dependent variables, and
2. the total number of variables mentioned in the PROC plus one

All results are still valid, but the dependent name is garbled, and other names may be for supplemental statistics.

- The SAS User's Guide: Statistics says that the data set created by an OUTPUT statement contains "all the variables for which the analysis was performed..." In fact, the output data set contains all the variables from the input data set, plus the ones named in the OUTPUT statement that contain statistics.
- When PROC CORR is used with the NOSIMPLE option on the PROC statement, the resulting OUTP= data set is not suitable for PROC REG or GLM because it does not contain an observation for the number of non missing observations for each variable. To circumvent this, do not use the NOSIMPLE option.

PROC RELEASE

- The error message 197: INVALID PARAMETER occurs if the TYPE= option is coded in PROC RELEASE. To circumvent this, use the BOUNDARY= option.

PROC RIDGEREG

- When there are more variables than observations PROC RIDGEREG abends with:

```
IBM301I      'oncode'=0320      'zerodivide'  CONDITION  RAISED  AT
OFFSET=000a60.
```

Having more variables than observations is a misuse of the procedure. Ridge regression should be used only for a full rank model. Run the model with fewer variables if possible, so the number of observations is larger than the number of parameters. It more generally abends when the design matrix is singular; e.g., when an extra column of ones is inserted.

PROC SCORE

- The TYPE= data set option and TYPE= procedure option are often confused in PROC SCORE. The procedure ignores the data set option. The procedure option TYPE= gives the value of the _TYPE_ variable from which scoring coefficients are to be obtained. The default value of the procedure option TYPE is "SCORE", which is appropriate for TYPE=FACTOR data sets. Never specify TYPE=FACTOR as a procedure option, since this will cause the factor pattern coefficients (which have _TYPE_='FACTOR') to be used as scoring coefficients.
- Residuals are being computed as "predicted-actual", not "actual-predicted"

PROC SIMNLIN

- To make the autoregressive specification described in the SAS/ETS User's Guide, 1982 Edition section on PROC SYSNLIN work for PROC SIMNLIN you need to transform the LAG of the expression. For example, change LAG(Y-YHAT) to LAG(Y)-LAG(YHAT). Moving average specifications do not work, since they require use of the lag before it is defined. SAS Institute suggests the truncated autoregressive equivalent, e.g. $A*LAG(U)+A**2*LAG2(U)+A**3*LAG3(U)$. . .

PROC SORT

- By default, observations are kept in their original order for identical BY variable values. When either NOEQUAL or EQUALS is specified, this option is passed to the systems sort utility and SAS takes no action to ensure any particular order. Presumably, EQUALS would have the same effect as SAS's default action.
- PROC SORT does not handle KEEP, RENAME or DROP statements. You can use these statements as data set name parameters on the DATA= and OUT= data sets.

GENERAL COMMENTS

- OPTIONS OBS=0; is not equivalent to a simple syntax check. Specifying this option requests that no input lines from external files be processed and that no observations be read from SAS data sets. Some unexpected results with OBS=0; are:
 1. External files are opened and closed for each data step. If you are writing to an external FILE with PUT, and end of file mark is written and any data in the file are wiped out.
 2. Procedures that process the directories of SAS data sets (DELETE and DATASETS) are executed
 3. PROC RELEASE is executed
 4. SAS data sets are created with zero observations
- The variables in a BY statement have to be variables on all data sets previously defined in SET statements. Input the data sets that do not contain the BY variables after the BY statement.
- An excessive number of DO groups within one DATA step may cause the error message 344 (STATEMENT TOO LONG) or (rarely) anabend.
- The value of the INDEX variable after a DO loop is $START + INCREMENT * (INT((STOP-START)/INCREMENT) + 2)$. When the INCREMENT is one and START & STOP values are integers, the final value is one greater than the STOP value.
- The OBS= option controls only the number of observations read by SAS using a SET statement or the number of records read by an INPUT statement. If the trailing @@ is used on the INPUT statement or an OUTPUT statement is used, for example, it is possible to create SAS data sets with more records than specified in the OBS=option.

- The message:

ERROR: THE VARIABLE XXX IN THE KEEP LIST HAS NEVER BEEN REFERENCED

appears if you try to KEEP a variable that has not been defined, or if you try to KEEP a variable that has already been referenced in a KEEP statement. A POINT= variable cannot be kept. If used on a KEEP statement the above error message is generated.

- TITLE statements beginning with a left parenthesis are not allowed within a DATA step or PROC MATRIX. Between DATA and PROC statements there is no restriction. To separate a TITLE from a DATA step place RUN; after the last statement in the DATA step. TITLE (. . . ; in a DATA step is parsed as an ARRAY name. TITLE (. . . ; in a PROC MATRIX is parsed as a matrix name. If you enclose the title or the left parenthesis in quotes then there is no restriction on where you place the statement in your SAS job. If TITLE (is used in a DATA step ERROR 5000 will occur. If TITLE (is used in PROC MATRIX then ERRORS 31, 19 33 and 32 will occur.
- The message ERROR 405: INVALID NUMERIC HEX LITERAL OR . . . will occur when the Word Scanner encounters a number followed by any character A-F. To avoid this, enclose the string in quotes. ERROR 405 has been reported in PROC FORMAT, and PROC EDITOR when specifying an INFORMAT of DATE and the month begins with an A-F. At this point in time there is no way to correct the problem with SAS.
- All KEEP, DROP and RENAME options associated with an input (SET) data set are executed before KEEP, DROP, and RENAME statements within a DATA step, which are in turn executed before the KEEP, DROP, and RENAME options associated with an output data set. Within these groups, KEEPS and DROPS are executed before RENAMES.
- Ranges of array names can't be used with double subscripting. For example:

```
DATA;
  ARRAY X(I) X1-X10;
  ARRAY Y(I) Y1-Y10;
  ARRAY Z(I) Z1-Z10;
  ARRAY XYZ(A) X--Z;
  DO OVER XYZ;
    DO I=1 TO 10;
      XYZ=0;
    END;
  END;
```

SAS will assume that the array XYZ contains the variables X1 to Z1, rather than the arrays X, Y, and Z. Thus, the outer loop would be executed 21 times, rather than 3 times.

- When a SAS procedure begins printing the results for a new BY--group, it prints a line giving the BY--variables, their values, and their labels. This line is truncated after 132 characters. You can suppress printing the variable labels by specifying: LABEL VAR1=VAR2= ; after the PROC statement. This LABEL statement is in effect only for the duration of the procedure. To suppress use of all variable labels specify OPTIONS NOLABELS;

- If a numeric variable does not have a format associated with it, SAS procedures will use an implicit format of BEST12. when grouping it for BY-processing. Thus, if a variable has a large number of significant digits and two observations differ in value only after the 9th significant digit, they will be grouped together in the same BY-group, even though they have different values. To avoid this, give the BY variables a format that provides enough differentiation when formatted values are used for BY-processing (e.g. BEST32.).
- Several procedures output blank pages when NOPRINT is specified. Among them are:
 SYSREG - writes headers on blank pages
 AUTOREG - blank page
 REG - prints title & BY-lines with NOPRINT and no options on MODEL
 SYNLIN - prints header
 ARIMA - prints extra pages with titles if NOPRINT is specified on IDENTIFY and FORECAST statements
 MATRIX
- SAS formats compared to formats in other languages:

<u>SAS</u>	<u>ASSEMBLER</u>	<u>FORTRAN</u>	<u>PL/I</u>	<u>COBOL</u>
RB4.	E	REAL*4	FLOAT BIN(21)	COMP-1
RB8.	D	REAL*8	FLOAT BIN(53)	COMP-2
IB2.	H	INTEGER*2	FIXED BIN(15)	COMP PIC 9999
IB4.	F	INTEGER*4	FIXED BIN(31)	COMP PIC 99999999
IB8.	-	-	-	COMP PIC 9(18)
PD4.	PL4	-	FIXED DEC(7,0)	COMP-3 PIC S9999999
ZD3.	ZL3	-	PICTURE'999'	DISPLAY PIC S 999
\$CHAR8.	CL8	A8	CHAR(8)	PIC XXXXXXXX or PIC X(8)

- When writing reports, the number of lines available to the report depends upon a number of factors. The number of lines available is the value of PS minus the number of TITLE lines, minus the value of SKIP=, and minus the number of FOOTNOTE lines (where appropriate).
- The END=option on multiple INFILE statements may not always work as indicated and should not be used. Use the EOF= option instead.
- When a very long title (80 characters or so) is used and the OPTIONS DATE is specified, the date overlays the title (rather than printing on the subsequent line as it should).

MACRO Statements

- %DO %UNTIL/%END is documented to work the same as the data step DO UNTIL/END. This means that the condition is evaluated at the bottom of the loop so that the statements within the loop are always executed at least once. However, %DO %UNTIL works the same as %DO %WHILE in that the condition is evaluated at the top of the loop.
- IF an * text . . . ; comment is the first statement inside a %MACRO, an ERROR 180 may be generated when the macro is executed. This usually occurs if the macro is called more than once. To circumvent the problem, move the comment after a statement or use /* . . . */ or /* . . . */ for the comment.

PROC X11

- The C19= option on an OUTPUT statement in the ETS procedure X11 is not recognized by SAS. An ERROR10 results if the C19= option is used.
- Every month of a series to be multiplicatively adjusted must contain a positive, non-zero numeric entry.

PROC DELETE

- Options NODSNFERR does not work with PROC DELETE, and the data set is flagged with an ERROR 200.

PROC SYSNLIN

- SYSNLIN has been modified so that shared parameter models are handled properly. (An experimental option from a previous release, NO2SLS, is now obsolete and unusable.) With shared parameter models, R-square can be distorted, even negative. This is because it is no longer appropriate to use the corrected SS as a denominator.

PROC SYSREG

- Tape input data sets cannot be used by SYSREG if:
 1. BY groups are used
 2. OUTPUT statements are used
 3. DW option is used
- You cannot use a variable list in the OUTPUT statement.
- If you use NOINT, model F and R-square use the unrestricted SS of the dependent (i.e., testing all parameters - 0). If using the RESTRICT statement, however,
$$\text{Model F} = \frac{(SST - SSE) / df_r}{MSE}$$
will be incorrect, even negative, since the formula adjusts for an intercept even though the intercept is not there. Therefore, always use NOINT rather than RESTRICT.
- If more than one dependent variable is specified on the MODEL STATEMENT in SYSREG and the COV option is used, the covariance matrix is printed for the last dependent variable only. The COVB & CORRB option can be specified on the SYSTEM statement in SYSREG. This is not documented for the 79 User's Guide or the 80 SAS/ETS Guide.

PROC TABULATE

- If the number of possible combinations of CLASS variable values, analysis variables, and statistics in the page expression of a TABLE statement is greater than 32767, incorrect output can be produced. Note that this is a problem even if the number of actual combinations on the data set is small. The number of possible combinations is calculated by adding the number of statistics for each analysis

variable and then multiplying this by the number of levels for each CLASS variable in the page expression. The following are possible solutions:

1. Put one or more of the CLASS variables in the page expression in a BY statement
2. Move one or more of the CLASS variables, the analysis variables, or the statistics to the row or column expressions. Reclassify the data to combine the information from two CLASS variables in the page expression one variable.

```

* * * * *
*           *
*       M U S I C       *
*           *
* * * * *

```

TO CALL MUSIC, DIAL: 565-3499;3989;3999;4025;4030.

MUSIC Backup Hours

Following are the scheduled hours for the MUSIC backup. A message will be sent to all users signed-on to MUSIC approximately 10 minutes before the backups are begun, and will be in the form: ** MUSIC SHUT DOWN AT xxxxx AM - SCHEDULED BACKUP ** To find out the backup hours while signed-on to MUSIC, enter HELP HOURS

MUSIC Backup Hours

Tuesday	3 AM (for about 3 hours)	Weekly Backup
Wednesday-Saturday	4 AM (for about 2 hours)	Daily Backup
Saturday	Midnight (for about 2 hours)	Daily Backup

Summer Classroom ID Codes Purged

All ID codes that were assigned through classes as part of the course requirement this summer were purged from the system August 13. Special arrangements must be made to reactivate any of these ID's, and must be done through the course instructor.

EDTSUB: Using the MUSIC Editor From Within a Program

'EDTSUB' is an editor subroutine which can be called from a user program. It loads the CONTEXT EDITOR from the system library, allocates work area and buffers for the editor, and gives control to the EDITOR. At the end of the edit, EDTSUB returns control to the calling program.

SYNTAX:

This subroutine can be called from the user program. The calling sequence is as follows:

CALL EDTSUB (FILENAME,PARMS,DELIM,CMDUNIT,WRKUNIT,AREA,LEN,RETCOD)

- **FILENAME** The name of the save file (or /INPUT) to be edited. Must end with a blank if less than 22 characters. It may be left blank (null).
- **PARMS** Editor options and commands, as on the /EDIT command following the file name. The end of the string is indicated by the delimiter character, as defined in the next argument. Maximum data length, not counting the delimiter, is 100 characters.
- **DELIM** A delimiter character, used to end the PARMS argument.
- **CMDUNIT** Unit number from which initial editor commands are to be read. It must be 0 to 15, and not 9 or 1 to 4. This unit replaces unit 5 from which the editor normally reads commands at the start of the edit session. If the unit is zero, no reads are done. To have the editor read commands from a file, the caller must open the file (e.g. using OPNFIL routine) before calling the editor, or define file in a /FILE statement. The order of editor input is:
 1. Input from 'CMDUNIT'.
 2. Commands from the 'PARMS' string, if any.
 3. Commands entered conversationally from the terminal.
- **WRKUNIT** Unit number of editor UDS work file (must be 1).
- **AREA** A main storage work area. The minimum size area is 16000 bytes. Typical size: 32000 bytes.
- **LEN** The length of the main storage work area. Must be 16000 or more.
- **RETCOD** Integer return code. See topic 4.

RESTRICTIONS and EXCEPTIONS:

Following is a list of exceptions and restrictions which must be considered when using the EDTSUB routine:

1. An editor UDS work file must be defined on unit 1, even if sufficient main storage work area is provided so that no work file I/O is needed.

2. Only a SAVE LIBRARY FILE can be edited. A UDS MAY NOT BE EDITED.
3. All of the 8 arguments in calling this subroutine must be specified. See SYNTAX topic 1.
4. Upon return from EDTSUB, various terminal options set by the EDITOR may still be in effect, and the user program may need reset some of these. For example, the Editor suppresses the conversational read prompt (the '?' prompt), and it may be restored by calling the 'PROMPT' routine. A 'TEXT LC' command done by the editor may be undone by calling the 'TEXT LC' subroutine.

EXAMPLE:

The following is an example of a FORTRAN program calling the EDTSUB subroutine:

```

/FILE 1 UDS(&&TEMP) NEW DELETE LR(128) NR(8000) BUFNO(0)
...
/LOAD FORTG1
  REAL*8 AREA(3000)
  INTEGER RETCOD
  CALL EDTSUB('MYFILE ','NEW;TEXT LC$','$',0,1,
              AREA,24000,RETCOD)
  IF (RETCOD .NE. 0) GOTO 900
  ..
  ..
900 WRITE(6,10) RETCOD
10  FORMAT(' ** ERR - RETURN CODE IS : ',I4)
  ..
  ..
  STOP
  END

```

RETURN CODES and MESSAGES:

Following is a list of possible RETURN CODES generated by EDTSUB after it has been called by the main program:

<u>CODE</u>	<u>DESCRIPTION</u>
0	Normal end of the EDIT (does not necessarily mean that a successful save was done).
1	Problem with the 'EDITOR' modules, inform the MUSIC system personnel of this problem immediately.
2	Error in arguments to this subroutine.
3	Main storage work area is too small.
4	(reserved)
5	(reserved)
6	Invalid operands in edit parameter field.
7	Save Library file name invalid.
8	File is in use.
9	File not found.
10	File not accessible.
11	File type is not suitable for editing (e.g. RECFM=U).
12	Save Library file's record length is too big.
13	UDS file being edited is not suitable for editing.
14	Editor work file is missing or not suitable.
15	Insufficient Editor buffer space or allocation (issued by the EDITOR).
16	Error reading the file being edited.
17	EDIT-LOG data already exists and user said to stop this edit and do edit restart.

MUSIC Support for CMS and UNLOADED PDS Files on Tape

Two new MUSIC utility programs are now available to retrieve CMS files which were dumped to a tape by using the CMS TAPE DUMP command, or members of an OS partitioned data set which were dumped onto tape using the IBM IEBCOPY utility. In both cases, all or selected files/members can be restored into a save library file. These utilities are available only upon request. For more information please call Mohamad Salashoor at 565-2324.

* * * * *
*
* V A X 1 1 / 7 8 0 s *
*
* * * * *

TO CALL THE VAXs, DIAL: 565-4030 and enter either CALL A780 or CALL B780, depending on which system you want (this is through the Local Area Network).

VAX Backup Schedule

Incremental backups of both VAX systems are performed Monday through Thursday at 5 PM. Any files that have been created or changed are backed up. Users do not have to log out, but any files that are open at the time of the backup will NOT be backed up.

Full backups of both systems are done every Friday at 5 PM. Again, users do not have to log out, but any files that are open will not be backed up.

A "stand alone" backup of both systems is done on the last working day of the month. During this time, all system software, as well as user files, are backed up. The systems must be taken down for this backup, which usually will not last more than 1/2 hour. All users that are logged on will be warned of the impending backup, and must log out.

NOTE: No backups are taken on the weekends. Requests for restoration of files should be made via MAIL to the username OP00.

VAX Administrator Hired

Mr. Kimball P. Stickney, currently a software engineer with Digital Equipment Corporation in Massachusetts, will join the Academic Computing staff on August 25 as Administrator for the VAX 11/780 minicomputers. Besides assuming his duties as VAX Administrator this Fall, Mr. Stickney will begin working on a PH.D. in Music here at NTSU. Mr. Stickney can be contacted by calling the Computing Center (565-2324).

TIMEOUT

A TIMEOUT facility has been implemented for all VAX users. If you leave your terminal unattended for 15 minutes, your session will be closed, and you will be logged off. You must reestablish your network session with the CALL command and log in again to resume computing. This was implemented in an effort to keep users from tying up ports when they are not really doing any computing.

VAX/VMS PRIMER

The VAX/VMS Primer is on 2-hour reserve at the Science and Technology Library in the Information Science Building. Three additional copies of this document will be available in the 5th floor lab area in the GAB.

```
* * * * *
*
*   H P - 2 0 0 0
*
* * * * *
```

TO CALL THE HP, DIAL: 565-3300;3900;3899;3966

HP 2000 Backup Schedule

Routine system backups are scheduled to be performed at the following times:

8:00 a.m. Monday through Friday for approximately 20 minutes.
4:00 p.m. Friday for approximately 1.5 hours.

HP NOTES

by

Jeff Brooks

Summer Class ID's Expired

All HP accounts assigned through a particular class (excluding those beginning with an F or an I which are faculty and individual accounts -- see below) expired on Friday, August 12 and were to be deleted from the system. If you have any other problems with your account, contact Academic Computing (565-2324).

Faculty and Individual Accounts to Expire September 1

All accounts beginning with F or I will expire on September 1. If you wish to keep your account active for another year, renewal forms are now being accepted. To renew your account, pick up a renewal form at the reception area of the Computing Center, fill it out, and return it to the receptionist on duty. Your renewal will validate your account until next September 1.

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GET A "SUBSCRIPTION" TO BENCHMARKS

BENCHMARKS is a vital link between the NTSU Computing Center and the users of our facilities. It is important for all users of the computing facilities to maintain a file of these newsletters because they contain materials which will periodically update existing documents as well as information and suggestions on uses of OS-MVT, MUSIC, the HP-2000, and other resources available to NTSU students and faculty. To facilitate the dispersal of BENCHMARKS, *** FREE *** subscriptions are now available. To receive yours, send the following information to us either by "snail mail" (the post office or campus mail) or electronically, through the MAIL facility on MUSIC.

Name _____

Mailing Address _____

PLEASE GIVE A CAMPUS ADDRESS (NOT BOX) IF POSSIBLE - It's Cheaper !

PLEASE RETURN TO:

Academic Computing Services
The Computing Center
NT Box 13495
North Texas State University
Denton, TX 76203